

I Claim:

1. A method for producing ferrotungsten-containing articles, the method comprising:

providing ferrotungsten-containing powder comprising magnetic and non-magnetic particles;

exposing the ferrotungsten-containing powder to a magnetic source to separate the ferrotungsten-containing powder into at least a magnetic fraction and a non-magnetic fraction; and

producing an article from at least a portion of the non-magnetic fraction.

2. An article produced according to the method of claim 1.

3. The method of claim 1, wherein the method further includes removing at least a portion of particles having a size smaller than a selected particle threshold.

4. The method of claim 3, wherein the removing step occurs prior to the exposing step.

5. The method of claim 3, wherein the removing step occurs after the exposing step.

6. The method of claim 3, wherein the removing step includes utilizing an ultrasonic screening process.

7. The method of claim 1, wherein the producing step includes placing a portion of the non-magnetic fraction into a jacket and sealing the jacket without compressing the portion of the non-magnetic fraction to a pressure that exceeds 20 ksi.

8. An article produced according to the method of claim 7.

9. The method of claim 1, wherein the producing step includes forming the article via powder metallurgy.

10. The method of claim 1, wherein the producing step includes forming an at least partially molten feedstock that includes the portion of the non-magnetic fraction.

11. The method of claim 1, wherein the article is a firearm projectile.

12. The method of claim 1, wherein the article is firearm ammunition.

13. The method of claim 1, wherein the article is a lead substitute.

14. Firearm ammunition, comprising:
a casing adapted to be received into a firearm;
primer and propellant within the casing; and
at least one projectile at least partially received into the casing,
wherein the at least one projectile is at least substantially comprised of a non-magnetic fraction of ferrotungsten-containing powder.

15. The ammunition of claim 14, wherein the ferrotungsten-containing powder is at least substantially formed from ferrotungsten.

16. The ammunition of claim 14, wherein the ferrotungsten-containing powder consists essentially of ferrotungsten.

17. The ammunition of claim 14, wherein the projectile includes a jacket.

18. The ammunition of claim 14, wherein the non-magnetic fraction is present in the projectile in powder form.

19. The ammunition of claim 14, wherein the projectile has a density of at least 9 g/cc.

20. The ammunition of claim 14, wherein the projectile has a density of at least 10.5 g/cc.

21. The ammunition of claim 14, wherein the projectile has a density of at least 12 g/cc.

22. The ammunition of claim 14, wherein the projectile includes a greater concentration of Fe_7W_6 phase and BCC tungsten phase than bulk ferrotungsten-containing powder.

23. A method for forming a jacketed firearm projectile, the method comprising:

providing a jacket defining an internal compartment and having an opening;

adding density-enhanced ferrotungsten-containing powder into the internal compartment;

sealing the jacket to produce a core having a density of at least 10.5 g/cc without compressing the density-enhanced ferrotungsten-containing powder beyond 20 ksi;

24. A jacketed firearm projectile produced according to the method of claim 23.

25. The method of claim 23, wherein the core has a density of at least 11 g/cc.

26. The method of claim 23, wherein the core is at least substantially non-magnetic.

27. The method of claim 23, wherein at least a substantial portion of the powder has a particle size greater than 325 mesh and less than 100 mesh.

28. A method for processing ferrotungsten-containing powder, the method comprising:

providing ferrotungsten-containing powder comprising magnetic and non-magnetic particles; and

exposing the ferrotungsten-containing powder to a magnetic source to separate the ferrotungsten-containing powder into at least a magnetic fraction and a non-magnetic fraction.

29. The method of claim 28, wherein the method further includes removing at least a portion of particles having a size smaller than a selected particle threshold.

30. The method of claim 29, wherein the removing step occurs prior to the exposing step.

31. The method of claim 29, wherein the removing step occurs after the exposing step.

32. The method of claim 29, wherein the removing step includes utilizing an ultrasonic screening process.

33. A method for producing ferrotungsten-containing powder, the method comprising:

providing ferrotungsten-containing powder comprising particles having sizes that are larger and smaller than a selected particle threshold; and

separating the powder into at least a fine particle fraction and a resultant fraction via an ultrasonic screening process.

producing an article from at least a portion of the resultant fraction.

34. Powder produced according to the method of claim 33.

35. The method of claim 33, wherein the method further includes separating at least the resultant fraction into at least magnetic and non-magnetic fractions.

36. The method of claim 35, wherein the magnetic separation occurs after the size separation.

37. The method of claim 35, wherein the method further includes magnetically separating the fine particle fraction into at least a fine magnetic fraction and a fine non-magnetic fraction.

38. The method of claim 37, wherein the method further includes mixing at least a portion of the fine non-magnetic fraction with at least a portion of the resultant fraction.

39. A method for processing ferrotungsten-containing powder, the method comprising:

providing ferrotungsten-containing powder;

at least one of density-enhancing the ferrotungsten-containing powder by removing ferrotungsten-containing powder particles having a density less than 13 g/cc, density-enhancing by removing ferrotungsten-containing powder particles that are drawn away from the powder when exposed to a magnetic source, and enhancing the flowability of the ferrotungsten-containing powder by removing magnetic particles from the ferrotungsten-containing powder.